8/8/21 Functions/Methods in JAVA

Functions/Methods (in java):

- A method is a block of code which only runs when it is called.
- To reuse code: define the code once, & use it many times.

Syntax:

```
public class Main {
    static void myMethod() {
        // code
    }
}
```

this method myMethod() does not have a return value.

name of method

```
public class Main {
    access_modifier return_type method() {
        // code
        return statement;
    }
}
```

f" ends here

- method() → calling the function.

  method → name of function

- **return_type :-**

A return statement causes the program control to transfer back to the caller of a method.
A return type may be premitive type like int, char, or void type (returns nothing).

⇒ there are a few important things to understand about returning the values:

- The type of data returned by a method must be compatible with the return type specified by the method.
  eg: if return type of some method is boolean, we cannot return an integer.
- The variable recieving the value returned by a method must also be compatible with the return type specified for the method.

⇒ Pass by value:

eg 1:

```
main() {
    name = "a";
    greet(name);
}
static void greet(naam) {
    print(naam)
}
```

object/value

name → @
naam → @

Creating copy of value of name

i.e., passing value of the reference.

eg 2:

```
psvm() {
    name = "a";
    change(name);
    print(name);
}
change(naam){
    naam = "b";
}
```

Creating copy

name → @
naam → @

name → @
naam → b

Since it is created inside fn it will not change original one.

not changing original object, just creating new object.

✱ Points to be noted:

1→• primitive data type like int, short, char, byte etc.
↳ just pass value

2→• object & reference:
↳ passing value of reference variable.

eg-1:

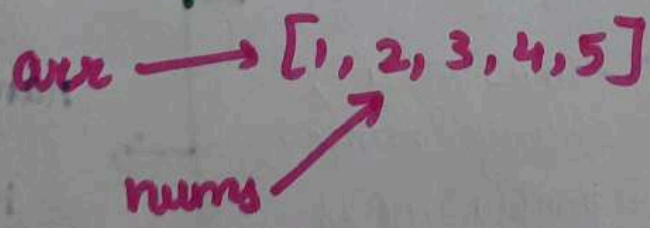
```
psvm() {
    a = 10;
    b = 20;
    swap(a, b);
}
swap(num1, num2) {
    temp = num1;
    num1 = num2;
    num2 = temp;
}
```

a → 10
b → 20
] but not here

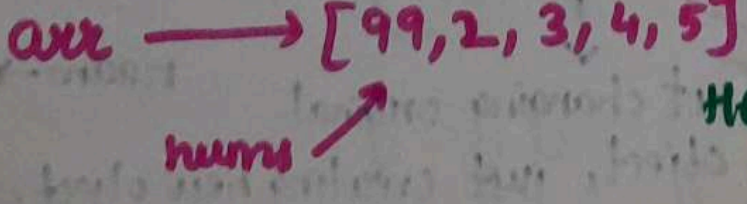
temp → 10
num1 → 20
num2 → 10
] at fn scope level they are swapped.

Here, they just passes the value....

eg-2:



nums[0] = 99 [now, the value of 0th position in nums will change which also changes value of arr[0]]



Here, passing value of reference variable

✱ Scopes:

- **function scope:**
  variables declared inside a method / function scope (means inside method) can't be accessed outside the method.

eg:-

```
psvm () {
}
all () {
    int x;
}
```

✗ ← can't be accessed outside

- **block scope:**

```
psvm ( ) {
    int a = 10;
    int b = 20;
    {
        int a = 5;   ✗
        a = 100;     ✓
        int c = 20;
    }
    c = 10;          ✗
    int c = 15;      ✓
    a = 50;          ✓
}
```

variables initialized outside the block can be updated inside the box.

variables initialized inside the block cannot be updated outside the box but can be reinitialized outside the block.

variables like "a" here, is declared outside the block, updated inside the block and can also be updated outside the block.

- **loop scope:**
  variables declared inside loop are having loop scope

⇒ Shadowing:

Shadowing in Java is the practice of using variables in overlapping scopes with the same name where the variable in low-level scope overrides the variable of high-level scope. Here the variable at high-level scope is shadowed by low-level scope variable.

eg:-
```
public class Shadowing {
    static int x = 90;
    psvm ( ) {.
        System.out.println (x);      // 90
        x = 50;                      // here high-level scope is shadowed by low-level scope
        System.out.println (x);      // 50
    }
}
```

⇒ Variable Arguments:

. Variable Arguments is used to take a variable number of arguments. A method that takes a variable number of arguments is a varargs method.

Syntax:

```
static void fun (int ...a) {
    // method body
}
```

Here, parameters would be array of type int [ ]

⇒ Method/ Function Overloading:

Function Overloading happens when two functions have same name.

eg → 1)
```
fun ( ) {
    //code
}

fun ( ) {
    //code
}
```
× function overloading

2)
```
fun ( int a ) {
    //code
}

fun ( int a, int b ) {
    //code
}
```
This is allowed having different arguments with same method name.

⇒ At compile time, it decides which fn to run.

⇒ Armstrong number:

Suppose there is number → 153

$153 \longrightarrow (1)^3+(5)^3+(3)^3 = 1+125+27$

$= 153$